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ABSTRACT

This study focused on the issue of whether "scripts" guide children's comprehension and recall of stories. Two groups of kindergarten and second-grade children (N=48) from middle class elementary school districts were told two stories about typical events in the life of a young child (eating dinner and going to bed). Children were asked to recall events in each story. Story recall was analyzed in terms of a "script" model and contrasted with the frequency of recall of designated core events and other logically consistent, supporting filler events. The use of two age groups permitted the testing of developmental changes in use of "scripts" and the evaluating of egocentric interferences and difficulty in sequencing ability. The major findings were that structural importance and not serial position guided recall; children were able to sequence properly with few idiosyncratic interferences; younger children recalled main events as well as older children; and recall for filler events improved with age. It was noted that many questions remain unanswered regarding the development and role of "script" knowledge, and that answers to such questions would assist better understanding of young children's cognitive operations.
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The Influence of Script-based Knowledge Upon Children's Story Recall

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Recent work on children's comprehension of stories (for example work down by Brown 1975; 1967; Mandler & Johnson 1977; and Stein & Glenn 1979) has called into question the claims made by Piaget (1926) and Fraisse (1963) that children's memories are "completely jumbled up" and are not sequential, causal or deductive. The recent work, based on the notion of a story schema or story grammar, and using stories that are more relevant to children's own experience, has shown that children of 4 to 7 years are capable of sequential, logically-connected recall of stories under favorable circumstances.

The notion of a story schema came originally from Bartlett (1932) who postulated that people use pre-existing schemata as guides to comprehension. One type of schema that has been related to story understanding by adults is a script as defined by Schank and Abelson (1977), that is, a mental representation of the sequence of actions called for in a familiar situation. Nelson (1979) has used the script construct to suggest one means children use to organize knowledge of their world. She described a script as a kind of model of repeated familiar experience which is called into play in the appropriate verbal or situational context. The model contains certain basic or obligatory events in sequence, predicts open slots for optional objects and events and what they may contain, and appropriate roles in the action and who can fill them. That is, there is a skeletal sequential structure that is called up in context and is filled in as needed with context-appropriate optional slot fillers and details. (Nelson 1979, p. 256).

It is clear then that children can remember sequences of actions told as stories or experienced in real life; that they have scripts for familiar events; and that adults use scripts in comprehending stories (Bower, Black & Turner, 1979). Can it be shown that children's scripts similarly guide their comprehension and memory for stories? If so, it might be suggested that script-type knowledge is an important foundation stone for the development of a story schema.

One step toward examining this question is to study children's recall for stories built around familiar scripts in order to determine how such scripts are used. This was the aim of the present study. An analysis of the story recall in terms of a script model contrasted the frequency of recall of designated core events and other logically-consistent supporting, filler events. Kindergarteners and second graders were chosen as participants to determine whether there were developmental changes in the ability to use script knowledge in story recall, and to evaluate the occurrence of egocentric interferences and difficulty in sequencing ability attributed to young children by Piaget and Fraisse.

The stories were composed of three sequences of activities within the theme of a typical evening in the life of a young child. The stories varied in sequence emphasis in order to see whether there were age differences in recall of components and sequences. It was hypothesized that subjects' changes would be logically consistent within the stories' theme, reflecting personal experience or familiarity with the specified routines.

Twenty-four kindergarteners and 24 second graders, from two neighboring, middle class elementary school districts, participated in the study; in each group half the subjects were girls and half were boys.

Two stories were constructed about a typical evening in the life of a young child. Each story contained an introduction, a dinner script, full or abridged. a television event, and a bed script, full or abridged. Thus, the stories did not vary in topic, but rather in emphasis. (The story events are presented in the handout) In one story the dinner script was emphasized, and in the other the bed script was emphasized. Each full script consisted of 14 events, where event was defined as a character action (for example, brushing one's teeth). The events chosen were extracted from verbal responses of preschoolers collected by Nelson (unpublished) and from informal verbal responses of adults collected by the experimenter to the questions, "What happens when you eat dinner?" and "What happens when you go to bed at night?" In the event selection an attempt was made to integrate the most frequently cited responses of both groups. Each abridged script consisted of 7 of the 14 events from the full script. These 7 events were judged as more salient than the remaining filler events by the two experimenters who collected the adult and child verbal protocols; the selection reflects their consensus. These salient or core events include the anchor events (i.e., the first and last events), and the main events (here, the events eating dinner, watching TV, and going to bed), among others. The filler events provide logically-consistent information which serves to support

the more salient events; these filler events represent routine actions as well, as opposed to more novel events.

Thus, the dinner-emphasis story consisted of the introduction, the full dinner script, the television event, and the abridged bed script, while the bed-emphasis story consisted of the same introduction, the abridged dinner script, the same television event, and the full bed script. The full and abridged scripts controlled for number of script events, number of sentences, and number of words. The full scripts consisted of 14 events, 11 sentences, and 101 words; the abridged script consisted of 7 script events, 6 sentences, and 50 words. Since the introduction and television event were common to both stories, the stories are equivalent along the above-specified dimensions. Note that the ratio of the full to the abridged script with respect to words and events is 2:1.

The girls heard a story, dinner or bed emphasis, about a character named Rose; and the boys about a character named George. Following a two-minute delay, during which subjects were asked to put away a toy with which they had been playing, subjects were asked to make a tape of the story they had just heard. They were also asked a series of questions regarding which parts of the story they liked, didn't like, and would change.

The story reconstructions were scored for the presence or absence of each event by a judge. A second judge coded the reconstructions of 8 children. The judges agreed 94% of the time. In addition, the reconstructions were scored for number of event inventions (for example, "After supper Rose did her homework."); number of event changes, where the child either made a significant phrase change which did not change the meaning of the event (for

example, "Rose said, 'May I be excused?'" for "Then Rose asked if she could leave the table.") or made a significant content change which still managed to carry the gist of the event's meaning (for example, "And he said, 'No, it's too late.'" for "Her father said, 'Sorry Rose, but you have school tomorrow.'"); and number of detail inventions or changes (for example, "pink nightgown" for "green pajamas). Agreement between the judges was perfect on the identification of these categories.

The data were analyzed using three-way (grade X gender X story) ANOVA's. As a first step in an effort to investigate whether a skeletal, script-like event structure determined children's recall, a comparison was made between anchor/main events and the remaining shared events of the dinner- and bed-emphasis stories, excluding the two-sentence introduction. Using a three-way ANOVA (grade X gender X event, where event is a repeated factor), it was shown that anchor and main events were recalled significantly better than the remaining events. In fact, an examination of the rank ordering of the shared events recalled across story emphasis showed that the kindergarteners' top five events included the three main events (events 11, 17 & 31) and the two anchor events (events 3 & 31); the second graders' top five events included two of the three main events and both anchors. Of interest is the fact that even the poorest recallers were sensitive to anchor and main events. The three poorest recallers, all kindergarteners, produced reconstructions consisting only of main events (for example, one child's story read "Bed. Watching television. Dinner.")

In addition both kindergarteners and second graders recalled core events better than filler events in the dinner-emphasis condi-

tion. This prediction was not upheld in the bed-emphasis condition; the unexpected salience of a three-event subsequence, consisting of a core event followed by two filler events (events 18, 19, & 20) seems to be the cause. However, serial position is not guiding recall, as evidenced by the fact that a comparison of the first four shared events and the last four shared events with the nine remaining, middle shared events showed no recall difference. Structural importance, not serial position, guides recall. For example, the introduction was recalled significantly less well than the remaining shared events, possibly because the introduction contains what Mandler and Johnson would call state or factual knowledge rather than event or action knowledge.

Few children reconstructed stories out of sequence. There were 24 separate time units in need of event sequencing, since some events were tied in terms of time of occurrance. Five kindergarteners and two second graders produced stories which violated the sequencing pattern. Four other children reconstructed sensible out-of-sequence reconstructions (for example, the story character washed his or her hands after dinner instead of before). Thus, 37 of 48 children produced stories in the exact sequence presented. Only three obvious egocentric interferences occurred; for example, a second grade boy began his story with George visiting a pet store.

Of the logically-consistent changes coded, three of the five types were made by over one-half of the subjects, the remaining two changes by over one-third. It is suggested that these changes reflect interferences from the children's personal knowledge about dinner time and bed time.

In order to determine whether children were sensitive to the variation in emphasis between the event sequences, an analysis was performed on the ratio between the number of events recalled in the emphasized script to the number of events recalled in the unemphasized or abridged script (perfect recall would reflect a 14 to 7, or 2 to 1 ratio). A three-way (grade X gender X story) ANOVA using an arcsin transformation on the data showed only grade to have had a significant effect. The second graders gave 2.3 times as much information about the emphasized script, while kindergarteners gave only 1.3 times as much information. As can be seen in the figure on the handout, a particularly interesting developmental finding is the fact that kindergarteners and second graders did not differ in the number of events reported for the unemphasized scripts, while the groups did significantly differ in the number of events reported for the emphasized scripts, with second graders reporting more events. Second graders tend to add filler events.

The purpose of the present study was to examine children's recall for script-based stories in an effort to determine whether the script model could account for the knowledge representations used by children. The major findings of the study are: (1) Structural importance and not serial position was shown to guide recall as evidenced by the fact that anchor and main events were recalled better than filler events. (2) Children were able to sequence properly with few idiosyncratic interferences. (3) Younger children recalled main events as well as older; improved recall with age was primarily for filler events. Moreover, core events were

recalled better than filler events in one story. It seems reasonable that a concept for routine events, or a script, could account for these findings.

In addition, the fact that changes did not reflect "incidental associations" but rather were logically consistent with the story's theme not only suggests that memory is reconstructive of past experience, but is also consistent with the idea that children have an ordered knowledge representation with which to understand a story about a typical evening in the life of a young child. Anecdotal evidence was provided during the questioning period to support this claim concerning changes. For example, one second grade boy referred to George's "red -- I mean green pajamas" in his story reconstruction, and then later said that he would change the color of George's pajamas to red because his own favorite pajamas were red. In addition, it does not seem too speculative to infer that children who referred to Rose or George going upstairs to bed, when the location of the story characters bedroom was not mentioned, themselves most likely have second floor bedrooms. Such interferences seem anything but incidental. The claim here is that much of what Fraisse would call jumbled up or egocentric reflects structure imposed from one's own knowledge base.

Further anecdotal evidence supporting the script construct was abundant. For example, two second graders continued their story versions past bedtime (for example, "And she went to bed and she wore her favorite pair of green pajamas. And the next morning she got up from bed. Didn't she eat her breakfast?") More evidence was given during the questioning period, when

children were asked what they would change about the story. Four children responded by inserting a sub-sequence of events which reportedly matched their own daily routines. For example, one second grade girl responded that she would change, "the part where you had to go to bed. You could go outside for a little bit and than you could watch TV and then you have your snack and then go to bed." It seems clear that these children noticed violations between the story and their own representations for similar events. Also of interest is the fact that nearly every child, when asked, cited a change he or she would make in the story, and that for the most part children wanted to add mundane event which complemented the story's theme (for example, "I would have Rose go outside after dinner.")

In conclusion it has been shown that children's stories are less egocentric than was once thought. Children's performance may be dependent upon the context of story material; they seem to do better with event as opposed to state knowledge. Because the script model is an event sequence model and because children appeared to use script knowledge to guide story output, as evidenced by their changes, it is proposed that the script model may serve as a valid model of one type of children's knowledge representation. Many questions regarding the development of script knowledge, stereotypic and personal, and the role of script knowledge in imposing structure remain, the answers to which could help us to understand better cognitive operations in young children.

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Table 1

Story Events

In dinner emphasis story	In bed emphasis story	Story event
I	I	(1) Rose enjoyed spending night-time with her parents
I	I	(2) Tonight would be a lot like other nights.
C(A)	C(A)	(3) Then Rose's mother yelled, "Dinner-time,"
C	C	(4) Rose was playing in her bedroom.
F		(5) Rose ran into the kitchen.
F		(6) and asked, "What's for dinner?"
F		(7) Rose's father told her they were having her favorite, spaghetti.
C	C	(8) Then she washed her hands in the bathroom.
C	C	(9) Rose's mother served them all a dish of spaghetti,
F		(10) and her father poured the milk.
C(M)	C(M)	(11) Then they all started eating their dinner.
F		(12) Rose's parents asked her what she had done at school that day.
F		(13) Then her parents talked about their day at work.
F		(14) Soon everyone finished eating.
C	C	(15) They had chocolate cake for dessert.
C(A)	C(A)	(16) Then Rose asked if she could leave the table.
C(M)	C(M)	(17) After dinner Rose and her parents watched some TV.
C(A)	C(A)	(18) After a while Rose's father said, "It's bedtime, Rose."
	F	(19) "Just a little longer?" she asked.
	F	(20) "Sorry Rose, but you have school tomorrow."
C	C	(21) Rose went to get ready for bed.
C	C	(22) She put on her favorite pair of green pajamas.
C	C	(23) In the bathroom she brushed her teeth
C	C	(24) and washed her face.
	F	(25) Then Rose's parents came to tuck her in.
	F	(26) Rose asked for a bedtime story,
	F	(27) so her mother told her one about life on a farm.
C	C	(28) After the story, Rose's mother and father kissed her good-night.
	F	(29) Her father shut off the light,
	F	(30) and whispered, "Sweet dreams."
C(M,A)	C(M,A)	(31) Soon Rose was fast asleep.

I stands for introduction

C stands for core event

M stands for main event, a type of core event

A stands for anchor event, also a type of core event

F stands for filler event

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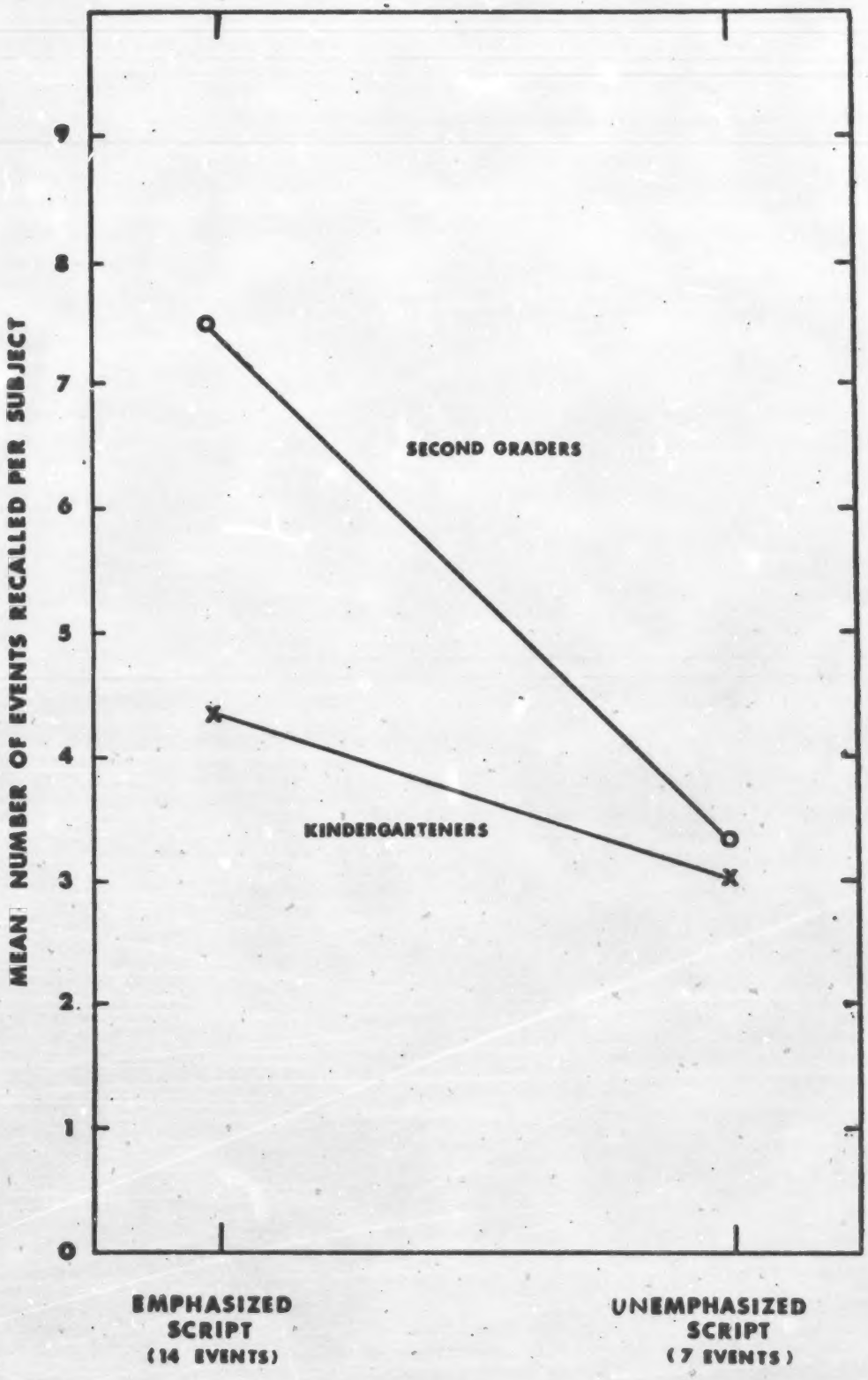
MEAN NUMBER OF EVENTS RECALLED PER SUBJECT
0
1
2
3
4
5
6
7
8
9
SECOND GRADERS
KINDERGARTENERS
EMPHASIZED SCRIPT (14 EVENTS)
UNEMPHASIZED SCRIPT (7 EVENTS)